

## A New Afrotropical Species of the Wasp Genus *Dolichurus* (Hymenoptera: Apoidea, Ampulicidae)

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*Abstract.*—The new species *Dolichurus foroforo*, widely distributed from west to east Africa, is described. It is compared with all currently recognized Afrotropical species of the genus. The new species is mainly characterized by its unusual coloration: in the female, the scape, apical margin of frontal platform, clypeus, tibiae, and tarsi are orange. In the male, the apical margin of frontal platform, pronotal tubercles, and tegulae are white, whereas most of the antennae and legs are bright orange. Additionally, metasomal terga I–III are coarsely, densely punctate (only laterally so in the female).

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*Dolichurus* is a cosmopolitan genus of mostly black, rather small cockroach-hunting wasps. The genus belongs in the Ampulicidae, which is basal within Apoidea (bees and the paraphyletic Sphecidae). It is considered to represent the sister group to all about 30,000 species of Apoidea, or to be one of its basalmost lineages (Melo 1999). *Dolichurus* has 49 species distributed by regions as follows (including the species described herein): Nearctic 1, Neotropical 2, Palearctic 5, Ethiopian 10, Oriental 27, and Australian 4. Australia and parts of the species-rich Oriental fauna were revised recently (Krombein 1979 for Sri Lanka, Tsuneki et al. 1992 for the Philippines, Tsuneki 1992 for southeast Asia, Ohl 2002 for Australia), but most parts of the world are still in need of taxonomic treatment.

Nine species and one subspecies of *Dolichurus* in sub-Saharan Africa are currently recognized (the current known distribution is given in parentheses, with the country of the type locality marked by an asterisk\*):

*Dolichurus basuto* Arnold, 1952 (Lesotho\*)

*Dolichurus bimaculatus* Arnold, 1928 (Democratic Republic of Congo, Zimbabwe\*)

*Dolichurus guillarmodi* Arnold, 1952 (Lesotho\*)

*Dolichurus ignitus* F. Smith, 1869 (Central African Republic, Democratic Republic of Congo, Rwanda, South Africa\*, Tanzania)

*Dolichurus ignitus contractus* Arnold, 1951 (Ethiopia\*)

*Dolichurus kohli* Arnold, 1928 (South Africa\*)

*Dolichurus quadridentatus* Arnold, 1940 (Democratic Republic of Congo\*)

*Dolichurus rubripyx* Arnold, 1928 (South Africa\*)

*Dolichurus secundus* de Saussure, 1892 (Madagascar\*) (= *D. tertius* de Saussure, 1892)

*Dolichurus venator* Arnold, 1928 (Zimbabwe\*)

Kohl (1893) was the first to treat the Ampulicidae on a comprehensive and worldwide basis, but he only listed the eleven species of *Dolichurus* known to him and copied or summarized their descriptions. He mentioned the three species from Africa described by Smith (1869) and Saussure (1892). In his revision of African *Dolichurus*, Arnold (1928) reported five species, and he described some others in subsequent publications (Arnold 1940, 1951, 1952). No African *Dolichurus* has been described in the last decades, and most already described species are known from very few specimens or even the types only.

Most Ampulicidae typically run over the ground or on tree trunks and are frequently overlooked by collectors. As a consequence, *Dolichurus* has also been essentially rare in collections until recently, when improved collecting methods (particularly Malaise traps) have revealed a remarkable amount of material even from remote areas of the world. Thus, the comparatively low number of currently recognized species from Africa south of the Sahara is a collecting artifact rather than an appropriate representation of the true species number in this diverse area. We recently started to revise African *Dolichurus*, and the material from a few collections only apparently represents 15 or more undescribed species. One of these species is morphologically quite distinctive and is represented by several specimens in both sexes from west to east Africa. It is herewith described as a first step towards a comprehensive revision of the genus in the Afrotropical region.

### Methods and Abbreviations

*Measurements, Terminology, and Abbreviations.*—Measurements and ratios were taken following the standards proposed by Ohl (2002). Measurements were made using an ocular micrometer on a LEICA MZ12 microscope and are in millimetres. **Body length** in females is measured from the apex of the pronotal platform to the apex of the tube formed by metasomal sternum VI, and in males from the apex of the pronotal platform to the posterior margin of tergum III (subsequent terga may be artificially exposed to varying degrees). The **forewing length** is taken from the apex of the humeral plate at wing base to the extreme wing tip. The **flagellomere-I-ratio** is the maximum length of flagellomere I divided by its apical width (in dorsal view). The **eye ratio** is the shortest lower interocular distance across clypeus divided by shortest upper interocular distance across ocellar area. The **oculo-ocellar-ratio** is the shortest distance between a

lateral ocellus and the eye margin divided by a midocellar diameter.

Terminology for general morphology follows Bohart and Menke (1976), with a few additions for *Dolichurus* by Ohl (2002). Distinction is made between the true abdomen (with the propodeum as its first segment) and the **metasoma** (excluding it). Accordingly, the propodeum is included as part of the mesosoma, but is excluded from the thorax. The **frontal platform** (lamella of Tsuneki 1992) is a median, U-shaped and platform-like extension of the frons overhanging the antennal bases. The **pronotal tubercles** are more or less prominent, dorsolateral swellings of the pronotal collar, which are separated by a median sulcus. The **metapostnotum** is usually referred to as 'propodeal triangle', 'triangular area' or 'propodeal enclosure' in Apoidea, but is in fact the metathoracic postnotum that is fused to the true propodeum (Brothers 1976). We follow Melo (1999) in differentiating **omaular carina** and **omaular sulcus**. The **episcrobal area** (= hypoepimeral area of Bohart and Menke 1976) is the upper portion of the mesopleuron posterodorsally of the episternal sulcus and the scrobal sulcus.

*Scanning Electron Microscopy.*—Specimens were examined using a LEO 1450VP scanning electron microscope. They were first removed from the pins and were then mechanically cleaned by removing obvious dirt and other debris. Finally, they were sputter-coated with gold-palladium.

*Sources of Material.*—Abbreviations used to indicate depositories of specimens are listed below with corresponding institutions and personal collections. When appropriate, the name persons who arranged the loans of material are mentioned in parentheses.

- |     |                                                                        |
|-----|------------------------------------------------------------------------|
| CAS | California Academy of Sciences, San Francisco, USA (W. J. Pularowski). |
| OHL | Personal collection of M. Ohl, Berlin, Germany.                        |

UCD Bohart Museum of Entomology,  
University of California, Davis,  
USA (S. Heydon, R. M. Bohart).

*Dolichurus foroforo* n. sp.  
(Figs 1–8)

*Derivation of name.*—The new species is named after the collecting locality of the holotype and most paratypes, Foro Foro in the Ivory Coast. It is a noun in apposition.

*Diagnosis.*—In the absence of a comprehensive revision of Afrotropical *Dolichurus*, comparison of *D. foroforo* with other species of the genus is difficult. Additionally, most currently recognized African *Dolichurus* are known from one sex only. We have studied approximately 20 African species of *Dolichurus*, most of which are undescribed, and the revision by Arnold (1928) and the original descriptions of all African species and subspecies. In most cases, Arnold's descriptions provide sufficient details for a reliable differentiation of *D. foroforo* from already described species. We conclude that the new species differs from all currently recognized African species of the genus in a unique combination of characters.

Females of *D. foroforo* are unique among African *Dolichurus* in the combination of the following characters: lateral portions of metasomal terga I–III with coarse, dense punctation (Fig. 7; metasomal punctation indistinct in most *Dolichurus*); scape, apical margin of frontal platform, and clypeal apex orange (black in most species); and coxae and femora brown, contrasting with orange tibiae and tarsi (legs uniformly colored in most African *Dolichurus*). Females of *D. foroforo* are similar to most African *Dolichurus* in having some apical metasomal segments red or orange (completely black or dark brown in *D. secundus*, *D. kohli*, *D. guillarmodi*, and one undescribed species). Among the species with a bicolored metasoma, *D. basuto* and *D. venator* have tergum III and the basal margin of tergum IV black (tergum III apically red in *D. foroforo*, besides other struc-

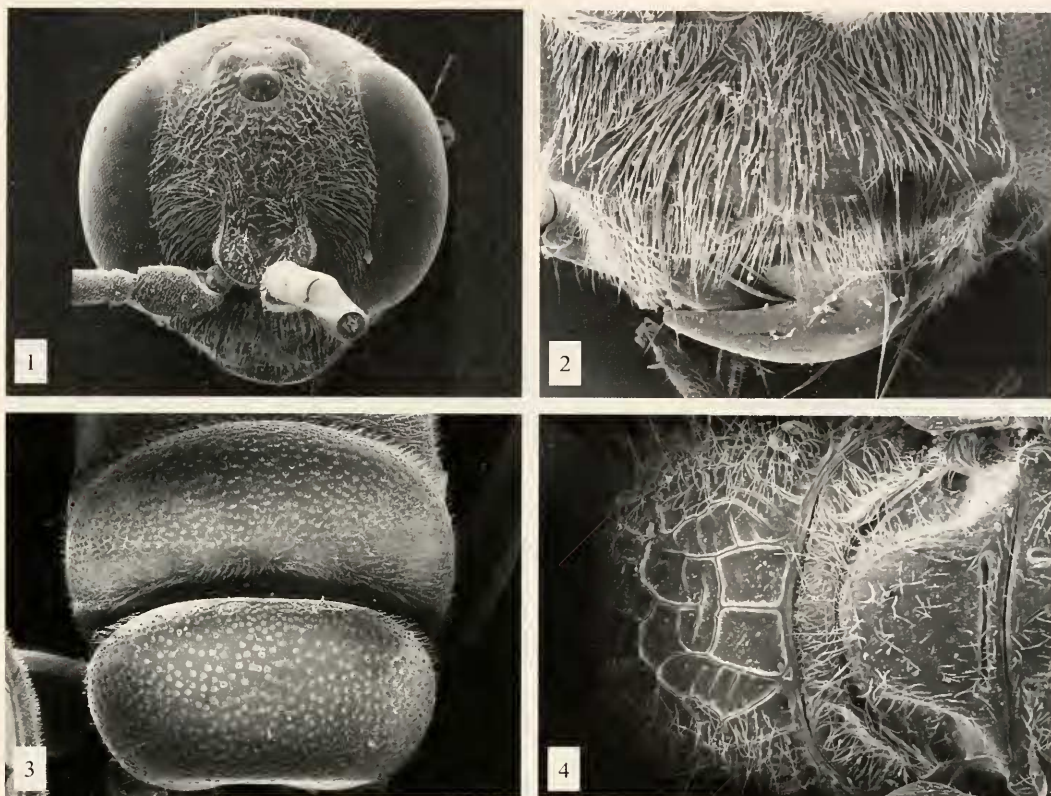
tural differences). Terga I–III are impunctate or have a very few minute, widely scattered punctures in *D. quadridentatus*, *D. ignitus*, and *D. rubripyx* (coarsely, densely punctate in *D. foroforo*; Fig. 7).

Males of *D. foroforo* are unique among African *Dolichurus* in the remarkable body coloration: the apical margin of the frontal platform, the pronotal tubercles, and the tegula are clearly marked with white, and most of the antennae and legs are bright orange. Additionally, male *D. foroforo* have the metasomal terga I–III coarsely, densely punctate (punctures no more than one diameter apart; Fig. 3). *Dolichurus bimaculatus* and *D. basuto* are similar in having largely orange legs, but *D. bimaculatus* has two white clypeal markings (clypeus black in *D. foroforo*), lacks white markings on the pronotal tubercles (present in *D. foroforo*), and has a markedly coarse, areolate face sculpture, which extends to the hindocelli (face sculpture not markedly coarse, irregular, not extending beyond midocellus in *D. foroforo*; Fig. 1). *Dolichurus basuto* also has white pronotal tubercles but the frontal platform and the tegula without white. The tergal punctation is also sparser in *D. bimaculatus* and *D. basuto* than in *D. foroforo*: at least some punctures along tergal midline are about three diameters apart and rather irregular in the former species, whereas one diameter apart and appearing markedly dense and regular in *D. foroforo* (Fig. 3).

*Description.*—Black. The following are orange: mandibles (tip narrowly black), antennae (slightly darker dorsally), and legs (except for tarsomere V, most of femora, and coxae). Wings hyaline to indistinctly infumate.

Face (Figs. 1–2) below antennae with dense, appressed, silvery setae; head otherwise and mesosoma with numerous erect, whitish setae, on mesosoma shorter ventrally. Metasoma with short, indistinct, white setae, each arising from a distinctive puncture (Fig. 3). Vestiture generally sparser in females than in males; female





Figs. 1-4. *Dolichurus foroforo*, male. 1, head in frontal view. 2, clypeus and mandibles. 3, terga I-III. 4, scutellum, metanotum, and metapostnotum.

metasoma predominantly without setation.

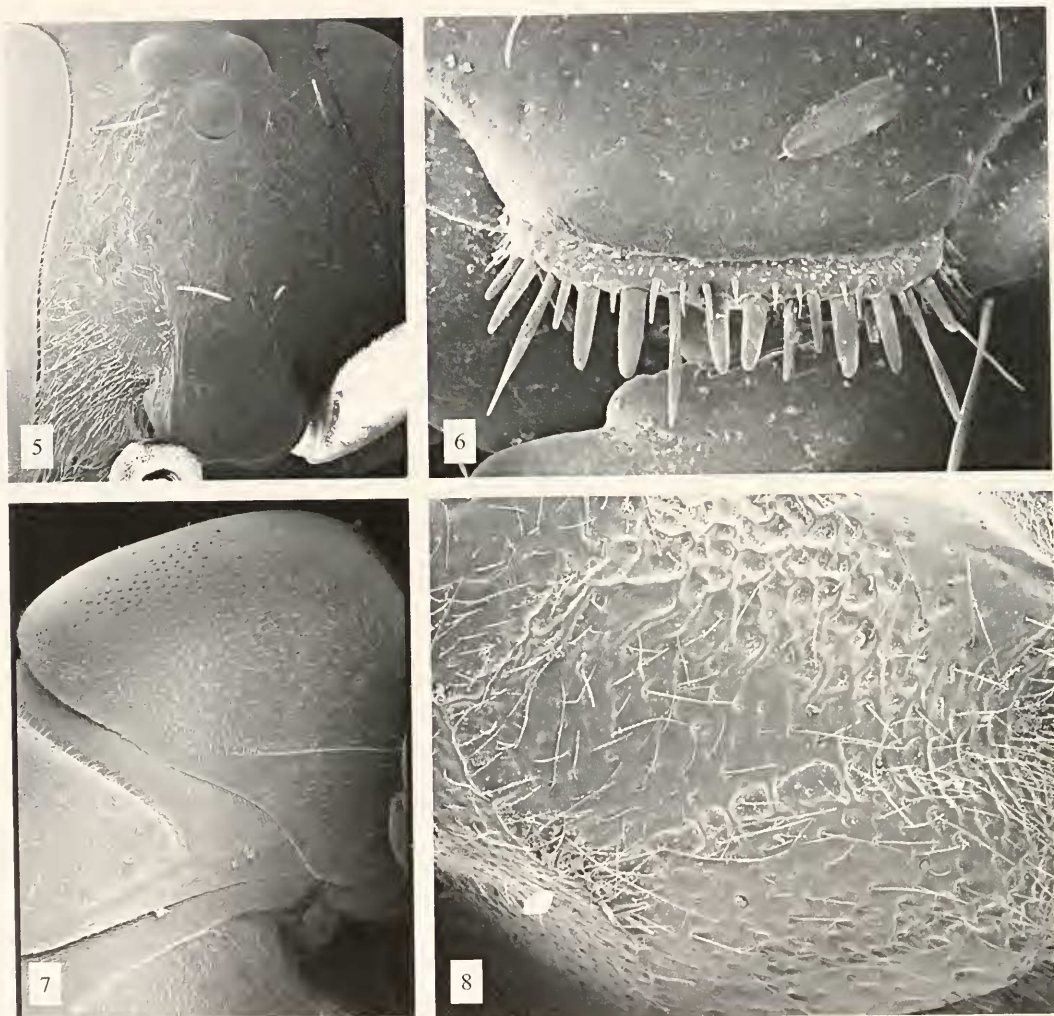
Face with rugulae laterally of midocellus oblique (Fig. 1). Vertex markedly shiny, with numerous scattered, shallow punctures.

Pronotal dorsum transversely rugose between tubercles, with distinct transverse carina; sides almost completely smooth and shiny. Mesopleuron obliquely rugose toward posterior margin. Omaular sulcus (as in Fig. 8) present, coarsely pitted, markedly bent posteriorly and fused with anterior section of scrobal sulcus before meeting tegula. Omaular carina sharp, ventrally continued by sharp, somewhat elevated acetabular carina. Midline of acetabular area posteriorly terminating in small, blunt tooth between markedly convex portions of acetabular carina. Sternau-

lus present, coarsely sculptured (Fig. 8). Coarsely pitted remnant of episternal sulcus meeting end of omaular carina at obtuse angle. Metanotum longitudinally rugose (Fig. 4). Metapleuron shiny, with a few irregular longitudinal rugulae dorsally. Metapostnotum with five to seven irregular longitudinal and a varying number of transverse carinae (Fig. 4); posteriorly delimited by lamellate carina. Propodeal hindface irregularly, coarsely rugose; laterally delimited by irregular carina, with small tooth-like projection at lower end.

**Female:** Metasomal segments IV-VI and apical margin of III orange.

Mandible tridentate. Clypeal lobe markedly protruding, somewhat overhanging mandibles, apically truncate, shiny (Fig. 6); median carina confined to basal half of



Figs. 5-8. *Dolichurus foroforo*, female. 5, frons in oblique frontal view. 6, clypeus. 7, lateral portion of tergum I. 8, mesopleuron.

clypeus. Margin of frontal platform markedly bulging (Fig. 5). Flagellomere I  $1.1\times$  as long as II, length of flagellomeres II-IV subequal, following flagellomeres becoming progressively shorter. Frons between base of frontal platform and midocellus densely, rather finely rugose; rugulae laterally of midocellus oblique (Fig. 5).

Punctuation of scutum and scutellum markedly sparser medially than laterally. Mesopleuron punctatorugose throughout (Fig. 8). Longitudinal rugulae on propodeal sides markedly developed.

Terga I-III and sterna II-III densely punctate laterally (Fig. 7), punctures widely scattered medially. Metasomal segments IV-VI virtually impunctate.

Body length 7.5-10.6 mm; forewing length 4.1-5.3 mm; flagellomere-I-ratio 4.6-5.0; eye ratio 1.2-1.3; oculo-ocellar-ratio 1.3-1.5.

**Male:** Apical margin of frontal platform orange (partly infused by white). Pronotal tubercle, anterior margin of frontal platform, and tegula with white markings.

Mandible broad, robust, bidentate (Fig.



2). Clypeus (Fig. 2) coarsely punctatorugose; with median carina, terminating in small, blunt tubercle; median clypeal lobe broadly deeply emarginate, emargination flanked by obtuse tooth. Frontal platform about as broad as long; indistinctly punctate in distal two-thirds; margin indistinctly bulging. Scape with ventral carina. Length of flagellomeres I–III subequal, following flagellomeres becoming progressively shorter. Frons between base of frontal platform and midocellus densely, coarsely rugose (Fig. 1).

Scutum, scutellum, and metanotum shiny, almost uniformly, shallowly punctate, punctures at least one diameter apart (Fig. 4). Propodeal side with rather regular, coarse, oblique rugulae; smooth anteriorly.

Terga coarsely, densely punctate throughout (Fig. 3); slightly sparser along midline of terga I–II; punctation very dense on tergum III, most punctures not more than 1.0 diameters apart. Sterna coarsely punctatorugose throughout. Sternum II markedly bulging anteriorly; with weakly developed basal, transverse carina and sulcus. Sternum III with sharply delimited, markedly depressed posterior margin.

Body length 5.6–6.9 mm; forewing length 3.4–4.6 mm; flagellomere-I-ratio 3.5–4.0; eye ratio 1.1–1.0; oculo-ocellar-ratio 1.1.

*Life History*.—Nothing is known about the life history of *D. foroforo*. A few males (from Togo, Kenya, and probably that from Senegal) have been collected by hand net, and the male from Ethiopia in a Malaise trap. There is no explicit information on the collecting method of the numerous specimens from Foro Foro (Ivory Coast), but it is likely anyway that they have been collected by yellow pan traps as part of an experimental agricultural survey as documented by Duviard (1973). Duviard set out yellow pan traps in selected heights above ground (0 cm, 50 cm, 100 cm, 150 cm, 200 cm) in different habitats. The label

data imply that the *Dolichurus* from Foro Foro have also been collected as part of this survey: D. Duviard is the collector, "Foro Foro/Bouaké/Ivory Coast" is the type locality, a period of a few days is given as collecting time, and finally, a smaller, second label gives 0 cm, 50 cm, 100 cm, and 200 cm.

The collecting locality is the "Forêt Classée du Foro Foro" (07°55'00"N 004°59'00"W), and details on the climate and the vegetation of the type locality of *D. foroforo* are given in Duviard (1973). Six males and fourteen females of *D. foroforo* have been collected in this area. Five of the males were trapped on ground level (0 cm) and one male at 50 cm. Labels with height information are absent in three females, and the remainder were collected as follows: 0 cm four females, 50 cm three females, 100 cm three females, and 200 cm one female. These results imply that males used to fly in low height above ground, whereas females seem to occur regularly from ground level to 150 cm. This probably reflects that searching strategies of females are different from males, because females primarily search for prey and for potential nesting sites, whereas males search for females. However, the number of specimens with data on flight height is too limited for significance tests.

*Type material*.—**Holotype**: male, IVORY COAST: Foro-foro, Bouaké, Afr[ique], D. Duviard, 17–19 Jan 1971 (CAS).

**Paratypes** (10 ♂, 14 ♀). same data as holotype, but, 23–25 Aug 1971, 13–15 Sep 1971, 27–28 Sep 1971, 27–29 Sep 1971, 29 Nov–1 Dez 1971 (3 ♂, UCD), 14–16 Dec 1970, 28–30 Dec 1970, 6–8 Jan 1971, 17–19 Jan 1971, 05–07 July 1971, 30 Aug–01 Sep 1971, 50cm, 15–17 Nov 1971, 29 Nov–01 Dec 1971, 13–15 Dec 1971, 21 Jan–03 Feb 1973, 1972 [no specific date], 1974 [no specific date] (10 ♀, UCD). [1 ♀ and 1 ♂ each in the Museum für Naturkunde, Berlin, The Natural History Museum, London, and the California Academy of Sciences, San Francisco.]

SENEGAL: Koumpentoum, Dec 1975, G. Couturier (1 ♂, UCD).

TOGO: Amaoudé, 17 km N Sokodé, 18 Feb 1991, W. J. Pulawski (2 ♂, CAS).

ETHIOPIA: Langano, ~1600m, 7°35'N 38°42'E, 8–12 Apr 1958, Malaise Trap [collector unknown] [1 ♂, OHL].

KENYA: Rift Valley Province, Marich Pass Field Studies Centre, 1°32.2'N 35°27.4'E, 9 Jun 1999, W. J. Pulawski and J. S. Schweikert (1 ♂, CAS).

### ACKNOWLEDGMENTS

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